

PHMSA Damage Prevention Initiatives and Technologies



**EPA Technology Transfer Workshop
May, 2017**

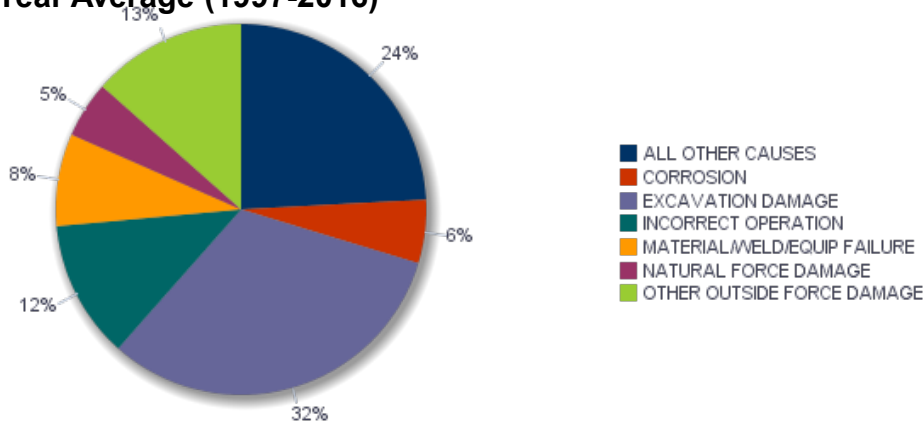
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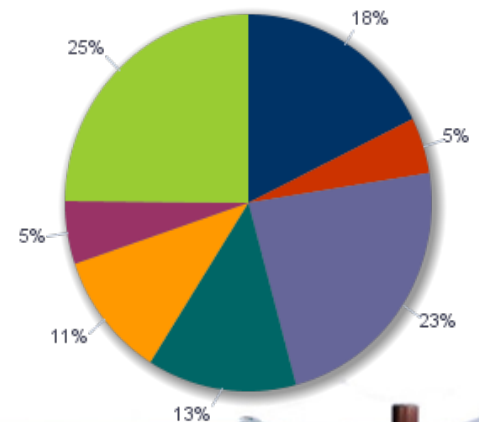
Background

- Excavation damage is leading cause of serious pipeline accidents
- Efforts to reduce this threat are showing results

**Serious Incident Cause Breakdown
20 Year Average (1997-2016)**



**Serious Incident Cause Breakdown
10 Year Average (2007-2016)**



PHMSA's approach to damage prevention

- Multi-faceted, with focus on stakeholder engagement and accountability
 - Data-driven
 - Regulatory initiatives
 - Resources and education
 - Technology *

* Primary discussion topic today



Damage Prevention Research

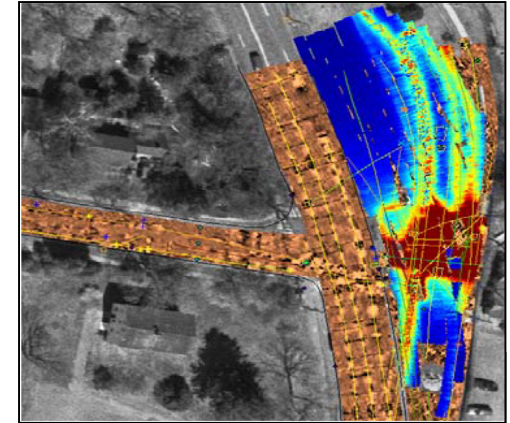
- Stakeholder input sought/generated for Damage Prevention research at 6 Pipeline R&D Forums
- Solicited for related topics in 10 research solicitations since 2002
 - However not all solicited topics successful in becoming new research
- Related Investment: 18 technology development, product development & process improvement projects using \$4.9M (PHMSA)



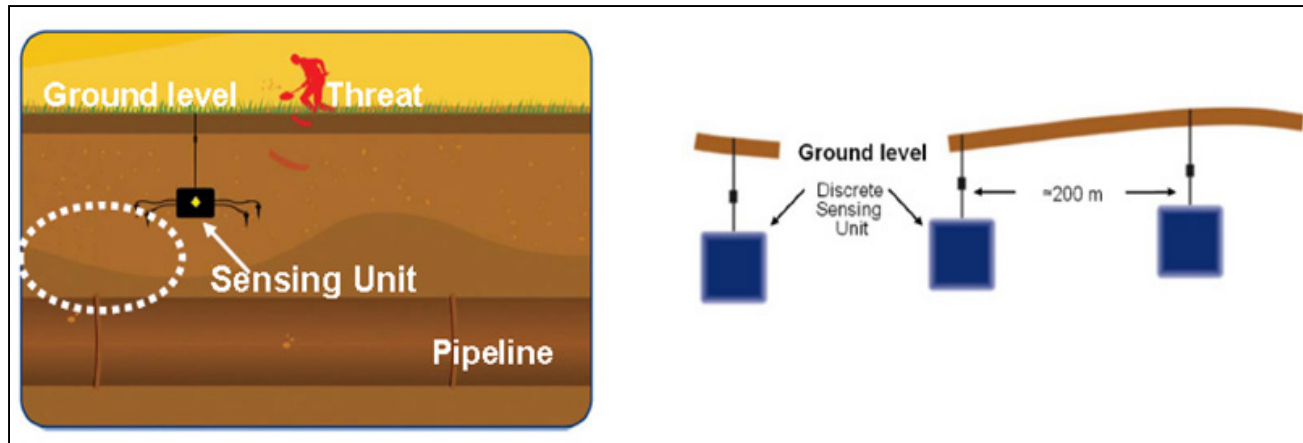
Notable Outputs/Impacts



Successful deployment of digging triggers on backhoes & integration into the VA Pilot Program



Commercial improvements to encroachment monitoring systems.

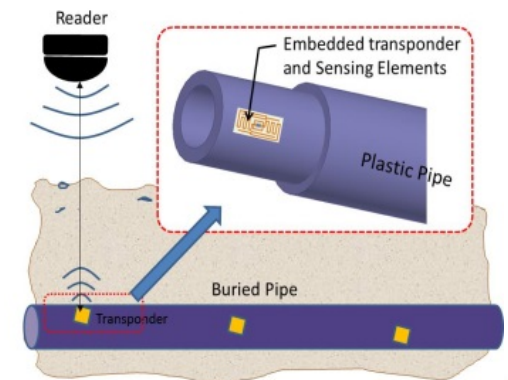
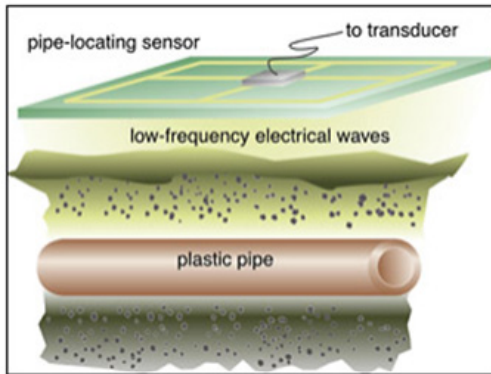


Commercial improvements to ground probing radar for sub-surface mapping



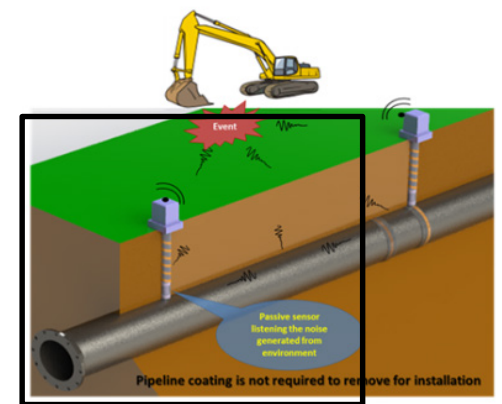
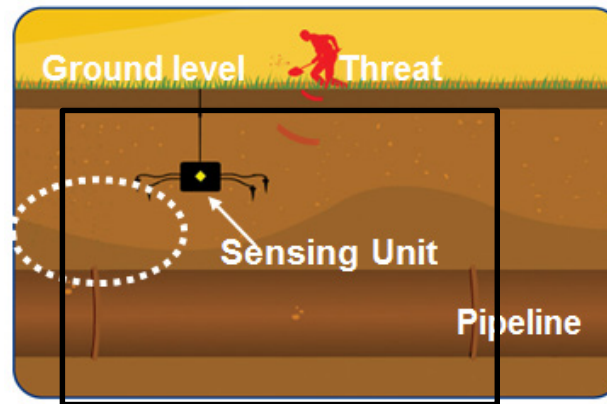
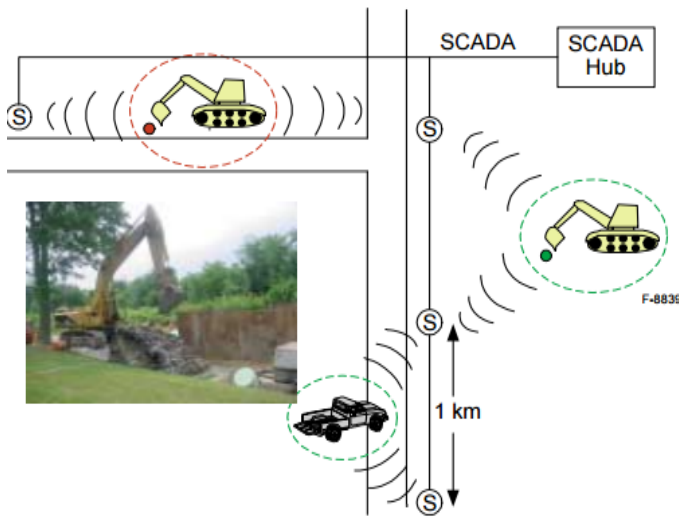
Active Research: Intrinsically Locatable Pipe

Project Title	Contractor	PHMSA	Resource Share
Embedded Passive RF Tags towards Intrinsically Locatable Buried Plastic Materials	University of Colorado Denver	\$300K	\$75K
Application of Amorphous Metals for Plastic Pipeline Detection	University of North Dakota Energy & Environmental Research Center	\$100K	\$25K
Advancement in the Area of Intrinsically Locatable Plastic Materials	West Virginia University	\$300K	\$78K
Subsurface Multi-Utility Asset Location Tool	Gas Technology Institute	\$126K	\$54K
Acoustic-based Technology to Detect Buried Pipes	Operations Technology Development NFP	\$280K	\$400K
Total		\$1.4M	\$707K



Other Notable Active Work

Project Title	Contractor	PHMSA	Resource Share
Infrasonic frequency seismic sensor system for preventing third party damage to gas pipelines	Northeast Gas Association	\$210,000.00	\$210,000.00
Pipeline Integrity Management for Ground Movement Hazards	Pipeline Research Council International	\$525,241.00	\$523,580.00
Advanced Development of PipeGuard Proactive Pipeline Damage Prevention System	Northeast Gas Association	\$268,492.00	\$71,508.22
Combined Vibration, Ground Movement, and Pipe Current Detector	Operations Technology Development NFP	\$299,030.00	\$299,030.00



2016 PHMSA R&D Forum – DP gaps identified

- Gap #1: Capture of accurate location of legacy existing assets. Stakeholders expressed need for:
 - Accuracy (<1ft),
 - User friendly, verifiable
 - Reliability, fast, low cost, system integration



2016 PHMSA R&D Forum – DP gaps identified

- Gap #2: Need for predictive analytics to sort and address major risks using multiple data sources
 - 90-95% accurate
 - Need substantial database of input data
 - Excavation activity (including planned), economic activity (permits and forecasting), past performance of excavators, other leading indicators...
 - Need to address data silo mentality, communication, legal framework/liability questions



2016 PHMSA R&D Forum – DP gaps identified

- Gap #3: Need for adoption of best practices and education of excavators and public
 - Best practices exist, but sometimes lack detail
 - Existing practices are developed by SME committee
 - Need for practices to be issued by authority (such as PHMSA)



2016 PHMSA R&D Forum – DP gaps identified

- Gap #4: Broader use of GPS with accuracy standards
 - Need for improved performance (1' accuracy, ease of use, integration into systems)
 - Need to address limitations such as urban canyons, tree and cloud cover
 - Need to incorporate data validation, data uniformity and scalability



PHMSA Damage Prevention Technology Study

- PIPES Act of 2016:
 - Requires PHMSA to submit study within one year of enactment of law (June 22)
 - Results must include recommendations, that include the consideration of technical, operational, and economic feasibility
 - Must be developed with stakeholder input




Study - Approach

- Identify technologies are in place
 - Locating
 - Mapping/GPS
 - Predictive analytic tools
 - Mobile devices
- Identify methods to improve excavation practices/technologies
- Analyze how increased use/development of the technologies could improve damage prevention
- Also looked at feasibility of national data repository, opportunities for stakeholder engagement



PHMSA Damage Prevention – more information

- Web site: PHMSA Stakeholder Communications – Safety Programs – Damage Prevention



Pipeline & Hazardous Materials
Safety Administration

Pipeline Safety Stakeholder Communications
Pipeline Safety Connects Us All


[Home](#) [General Public](#) [Emergency Officials](#) [Local Officials](#) [Excavators](#) [Property Developer/Owner](#) [Pipeline Safety Advocates](#) [State Regulators](#) [Federal Agencies](#) [Industry](#) [Contact Us](#)

Site Pages


- About Pipelines
- Regulatory Oversight
- Safety Programs
- Public Outreach

State Pipeline Profiles:

Choose One... ▼

 Print

Damage Prevention



State Damage Prevention Program Characterization (SDPPC) Evaluations were Updated in 2014

PHMSA Issues Final Rule to Determine Adequacy of State Excavation Damage Prevention Programs

PHMSA has created an [interactive map of reportable pipeline incidents caused by excavation damage](#).

Excavation damage continues to be a leading cause of pipeline incidents.

Pipeline incidents caused by excavation damage can result in fatalities and injuries, as well as significant costs, property damages, environmental damages, and unintentional fire or explosions. PHMSA's Pipeline Data Mart (PDM) allows you to [query state-specific pipeline excavation damage data](#).

State-specific Damage Prevention Information

Summary of State Damage Prevention Laws

In 2010, PHMSA enlisted the help of the North American Telecommunications Damage Prevention Council (NTDPC) to survey and summarize state damage prevention laws relative to specific characteristics, such as requirements applicable to excavators and utility operators. You may view the summary [online](#) or [download the summary spreadsheet \(Microsoft Excel format\)](#).

Notice: PHMSA has issued a [Final Rule](#) to revise Federal pipeline safety regulations to establish criteria and procedures relating to determining the adequacy of state damage prevention law enforcement programs, and enforcement proceedings where Federal authority is exercised.

Notice: In October 2014 PHMSA submitted to Congress a report entitled, "[A Study on the Impact of Excavation Damage on Pipeline Safety](#)". The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (Public Law 112-90, January 3, 2012) directed the Secretary of Transportation to conduct this study on the impact of excavation damage on pipeline safety, including the impact of removing all exemptions for mechanized equipment from State one-call laws.

State Damage Prevention Program Characterizations

Since 2009 PHMSA has lead assessments to characterize the extent to which the nine elements of effective damage prevention programs are being incorporated into each state's damage prevention program. The nine elements were cited by Congress in the Pipeline Inspection, Protection, Enforcement and Safety (PIPES) Act of 2006. Working with state

Pipeline Incident 20 Year Trends

PHMSA has collected pipeline incident reports since 1970. The reporting regulations and incident report formats have changed several times over the years. PHMSA has merged the various report formats to create pipeline incident trend lines going back 20 years. [Follow this link](#).

Pipeline and Hazardous Materials
Safety Administration

hazardous materials transportation

